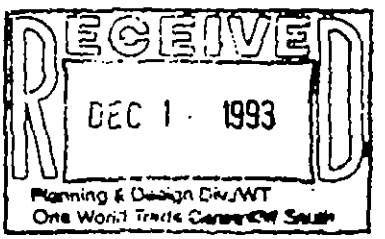
MISC 2

LERA

Leslie E. Robertson Associates
Consulting Structural Engineers

WTCI-659-P



211 East 46th Street
New York, NY 10017-2989

Tel: (212) 750-9000
Fax: (212) 750-9002

William J. Faschan
Leslie E. Robertson
Saw-Teen See
Richard Zottola

8 December 1993
File: B1003143

Mr. Suren Batra
World Trade Center Planning
The Port Authority of New York & New Jersey
One World Trade Center, Floor 36 South
New York, NY 10048

Refireproofing Elevator Shafts 6 & 7, 1 WTC
PANYNJ Job No.

Dear Suren:

We send you our revised estimate of the cost of our services associated with the design of the proposed refireproofing of elevator shafts 6 and 7 in One World Trade Center.

We expect that the scope of our services will include the following:

- Determine the thickness of fireproofing required for beams and columns exposed within the shafts from the pit to floor 32.
- Prepare drawings identifying the thickness of fireproofing required.
- Perform site visits and attend meetings as required.

Note Regarding Condition of Existing Fireproofing:

Suren, as you requested, we observed the condition of the existing fireproofing above the 32nd floor. We did not notice any large areas of missing or damaged fireproofing and therefore, conclude that no repair work is required. You should be aware that our opinion regarding the condition of fireproofing above the 32nd floor is based solely on a visual inspection. We did not attempt to verify that the material applied is of the correct thickness, and we did not test the condition of the existing material.

Paul A. Asp, Elaine A. Castellano, W. John Pugh, Daniel A. Sesil
John D. Hollyday, Monica V. Svojsik

MISC 2

LERA

On the basis of our contract with you, we estimate that our billings for these services will amount to approximately $6,800.00.

We appreciate this further opportunity to work for the PANYNJ. Should you have questions concerning this estimate, please call our Bill Faschan.

Very truly yours,

LESLIE E. ROBERTSON ASSOCIATES

Saw-Teen See

Saw-Teen See
Managing Partner

STS/lc
Enclosure

cc: Mr. Richard Cronin, PANYNJ
Mr. John Mauk, PANYNJ
Mr. Paul Marchese, PANYNJ

WJF, EAC

MISC 2

LERA

Leslie E. Robertson Associates
Consulting Structural Engineers

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Tel: (212) 750-9000
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William J. Faschan
Leslie E. Robertson
Saw-Teen See
Richard Zottola

29 March 1994
File: P1003143

Mr. Suren Batra
WTC Planning Dept.
The Port Authority of NY and NJ
One World Trade Center, Floor 36 South
New York, NY 10048

Reference: Refireproofing Elevator Shafts 6 & 7, 1 WTC
Construction Cost Estimate

Dear Suren:

We have estimated the probable construction cost for the Refireproofing Work shown in the Drawing Book dated 31 March 1994 as follows:

Material	$ 5,000.00
Labor	$30,000.00
Equipment	$ 6,000.00
TOTAL:	$41,000.00

These estimates do not include General Contractor's overhead and profit.

Suren, you should note that since LERA has no control over the cost of labor, materials, equipment or services furnished by others, or over the Contractor(s)' methods of determining prices, or over competitive bidding or market conditions, LERA's opinions of probable Construction Cost provided for herein are made on the basis of LERA's experience and qualifications, and represent LERA's best judgement as an experienced and qualified professional engineer, familiar with the construction industry; but LERA cannot and does not guarantee that proposals, bids or actual Construction Costs will not vary from opinions of probable cost prepared by LERA. If prior to the Bidding or Negotiating Phase PANYNJ wishes greater assurance as to Construction Costs, PANYNJ is advised to employ an independent cost estimator.

Very truly yours,

LESLIE E. ROBERTSON ASSOCIATES

Whitney P. McNulty

WPM/tc

WJF

Paul A. Asp, Elaine A. Castellano, John D. Hollyday, W. John Pugh, Daniel A. Sesil, Monica V. Svojsik

MISC 2

REFIREPROOFING ELEVATOR
SHAFTS 6 & 7
1 WTC
Structural Drawing Book

31 March 1994

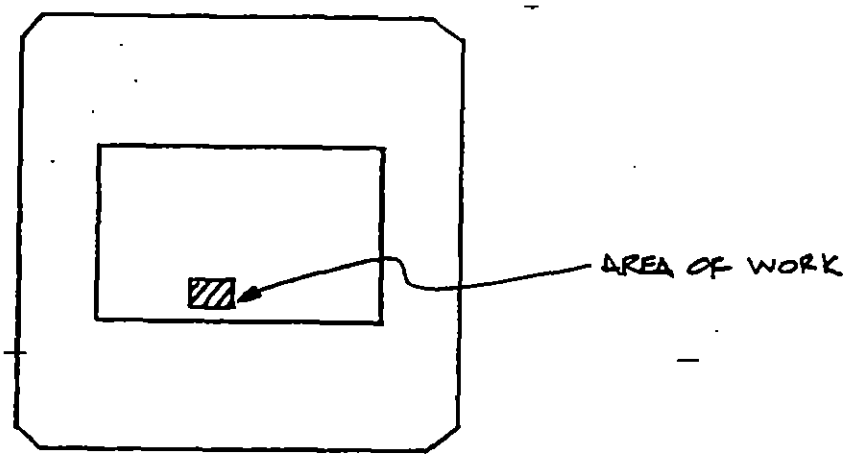
211 East 46th Street
New York, NY 10017-2989
Tel: (212) 750-9000
Fax: (212) 750-9002

Leslie E. Robertson Associates LERA Consulting Structural Engineers

REV.	LERA LESLIE E. ROBERTSON ASSOCIATES CONSULTING STRUCTURAL ENGINEERS	P1003143	DRAWING NO.
	REFIREPROOFING ELEVATOR 6 & 7 - 1 WTC	DRAFT WPM	1.1 - 1
	KEY PLANS & CONTENTS	DESIGN WPM	
		CHECK	31-MARCH-94

CHAPTER	TITLE
1.1	KEY PLANS & CONTENTS
1.2	PAGE LISTING & CURRENT DATES
1.3	GENERAL NOTES
2.1	PART PLAN-TYPICAL FLOOR
2.2	REFIREPROOFING THICKNESS SCHEDULE
3.1	COLUMN SPLICE DETAIL

THE PROFESSIONAL SEAL AND SIGNATURE AFFIXED HEREON IS ALL INCLUSIVE FOR THE FULL CONTENTS OF THIS DOCUMENT.



KEY PLAN

MISC 2

REV.	LERA LESLIE E. ROBERTSON ASSOCIATES CONSULTING STRUCTURAL ENGINEERS	P1003.43	DRAWING NO.
	REFIREPROOFING ELEVATOR 6 & 7 - 1 WTC	DRAFT WPM	1.2-1
	PAGE LISTING & CURRENT DATES	DESIGN WPM	
		CHECK	31-MARCH-94

PAGE	CURRENT DATE
1.1-1	31 MAR 94
1.2-1	31 MAR 94
1.3-1	31 MAR 94
2.1-1	31 MAR 94
2.2-1	31 MAR 94
3.1-1	31 MAR 94

MISC 2

REV.	LERA LESLIE E. ROBERTSON ASSOCIATES CONSULTING STRUCTURAL ENGINEERS	P1003143	DRAWING NO.
	REFIREPROOF ELEVATOR 6 & 7 - 1 WTC	DRAFT WPM	
	GENERAL NOTES	DESIGN WPM	1.3-1
		CHECK	3.31.94

GENERAL NOTES

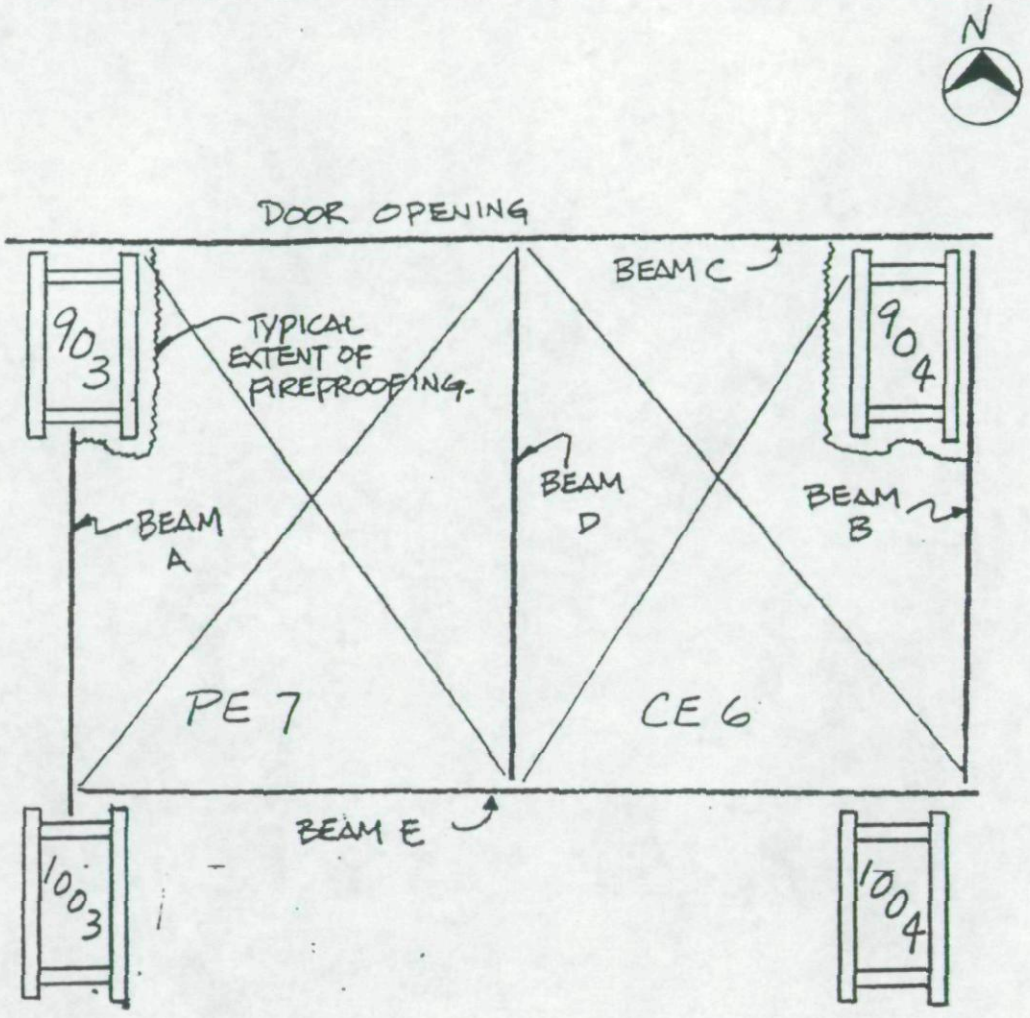
1. FIREPROOFING SHALL BE APPLIED TO EXPOSED SURFACES OF BEAMS AND COLUMNS IN THE THICKNESS INDICATED.

2. THICKNESS OF FIREPROOFING IS BASED ON THE USE OF MONOKOTE TYPE Z-106 SPRAY-ON FIREPROOFING, MANUFACTURED BY W.R. GRACE CO.

3. COLUMN SPLICES ARE TYPICALLY 3 FEET ABOVE THE FLOORS INDICATED. FIREPROOFING THICKNESS FOR THE 3 FOOT LENGTH SHALL BE THE SAME AS THAT GIVEN FOR THE FLOOR BELOW. SEE COLUMN SPLICE DETAIL.

MISC 2

REV.	LERA LESLIE E. ROBERTSON ASSOCIATES CONSULTING STRUCTURAL ENGINEERS	P 1003143	DRAWING NO.
	REFIREPROOF ELEVATOR 6+7-1 WTC	DRAFT WPM	2.1-1
		DESIGN WPM	
	PART PLAN - TYPICAL FLOOR	CHECK	3.31.94



- BEAMS A AND B, AND COLUMNS 903 AND 904 TO BE FIREPROOFED. SEE SCHEDULE ON PAGE 2.2-1.
- BEAMS C AND E ARE CONCRETE ENCASED AND DO NOT RECEIVE FIREPROOFING. BEAM D IS NOT FIREPROOFED.
- COLUMNS 1003 AND 1004 ARE NOT ACCESSIBLE FROM THE ELEVATOR SHAFTS.

MISC 2

REV.	LERA LESLIE E. ROBERTSON ASSOCIATES CONSULTING STRUCTURAL ENGINEERS	P 1003143	DRAWING NO.
	REFIREPROOF ELEVATOR 6 & 7 - 1 WTC	DRAFT WPM	2.2-1
	REFIREPROOFING THICKNESS SCHEDULE	DESIGN WPM	
		CHECK	3.31.94

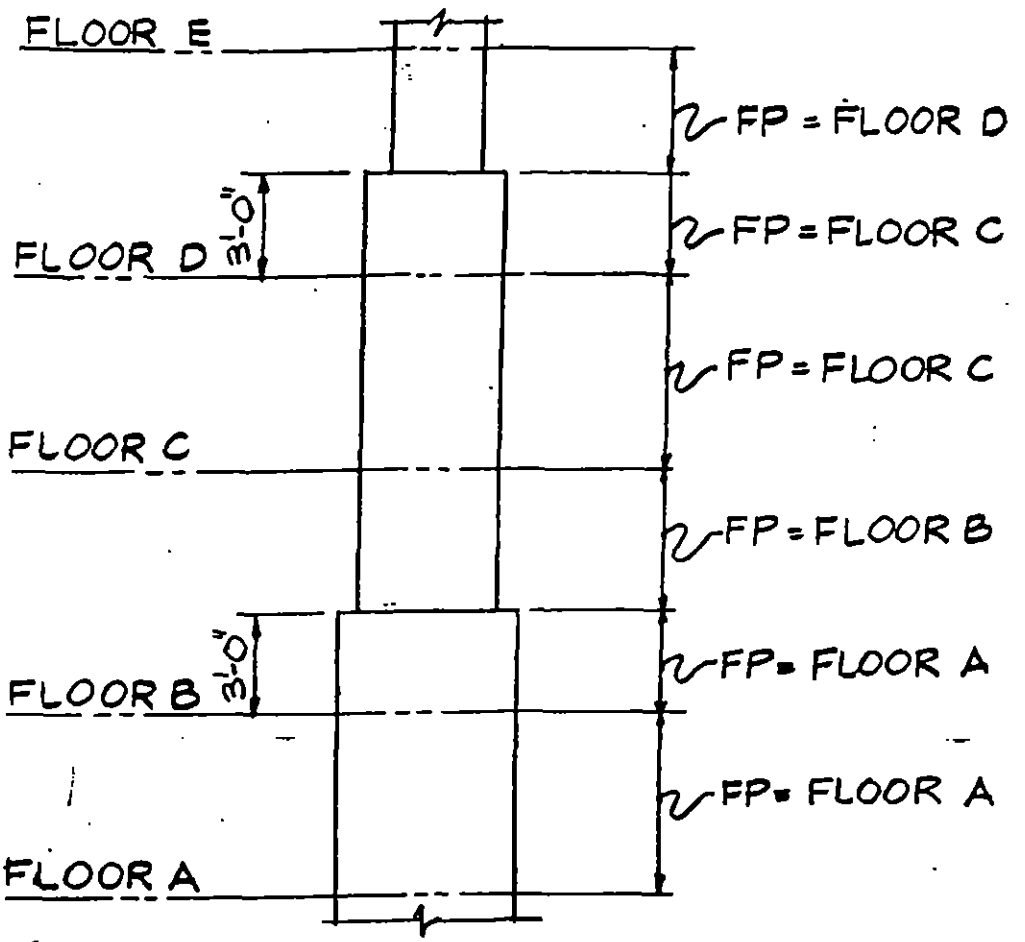
FLOOR	COL 903	COL 904	BEAM A	BEAM B
B2	3/8	7/16	NOTE 1	15/16
B1	3/8	7/16	1/2	NOTE 1
EL. 294	3/8	7/16	7/16	15/16
1	3/8	7/16	7/16	1-1/16
INT.	3/8	7/16	1/2	NOTE 1
2	3/8	7/16	1/2	15/16
3	3/8	7/16	1/2	1
4	3/8	7/16	1/2	1
5	3/8	7/16	1/2	1
6	3/8	7/16	1/2	1
7 †	3/8	7/16	1/2	1-3/16
8	3/8	1/2	1/2	1-3/16
9	3/8	1/2	1/2	1-3/16
10	3/8	1/2	1/2	1-3/16
11	3/8	1/2	1/2	1-3/16
12	3/8	1/2	1/2	1-3/16
13	3/8	1/2	1/2	1-3/16
14	3/8	1/2	1/2	1-3/16
15	3/8	1/2	1/2	1-3/16
16	3/8	1/2	1/2	1-3/16
17	3/8	1/2	1/2	1-3/16
18 †	3/8	1/2	1/2	1-3/16
19	3/8	5/8	1/2	1-3/16
20	3/8	5/8	1/2	1-3/16
21	3/8	5/8	1/2	1-3/16
22	3/8	5/8	1/2	1-3/16
23	3/8	5/8	1/2	1-3/16
24	3/8	5/8	1/2	1-3/16
25	3/8	5/8	1/2	1-3/16
26	3/8	5/8	1/2	1-3/16
27	3/8	5/8	1/2	1-3/16
28	3/8	5/8	1/2	1-3/16
29	3/8	5/8	1/2	1-3/16
30	3/8	5/8	1/2	1-3/16
31	3/8	5/8	1/2	1-3/16
32	3/8	5/8	1/2	1-3/16
33	3/8	5/8	1/2	1-3/16

NOTE 1: BEAMS REFERRED TO THIS NOTE ARE CONCRETE ENCASED.

† INDICATES COLUMN SPLICE AT THIS FLOOR.
SEE COLUMN SPLICE DETAIL.

MISC 2

REV.	LERA LESLIE E. ROBERTSON ASSOCIATES CONSULTING STRUCTURAL ENGINEERS	P1003143	DRAWING NO.
	REFIREPROOF ELEV 6 ↑ 7 - 1 WTC	DRAFT WPM	3.1-1
	COLUMN SPLICE DETAIL	DESIGN WPM	
		CHECK	3·31·94



SEE GENERAL NOTE 3

MISC 2

LERA

1 WTC
Refireproofing Elevator Shafts 6 & 7
Estimate of Personnel Requirements
12/7/93

Task	Hours by Skill		
	Principal	Engineer	Drafter
Calculate thickness	2	24	-
Prepare drawings	3	24	40
Site visits	4	12	-
Total	**9**	**60**	**40**

	Hours	Rate	Est. Billings
Principal	9	$85	$765
Engineer	60	$58	$3,480
Drafter	40	$47	$1,880
Total Labor			**$6,125**
Reimbursable Costs @ 10%			**$613**
Total Estimate			**$6,738**

(7)

DOCUMENT DATA FORM **Your Name: Nick Carino**

Document Title or Description (max. 254 characters): Circle: Same as cover (or fill in below)

Refireproofing Elevator Shafts 6 & 7 1 WTC

Include work order no. and floor no. if applicable Drawing Book and Dec. 8 1993 Letter to PA

Roll #: [redacted]	**Doc. ID (report #, dwg. #):**

Document Date: March 31 1994	**Document Author Name:**	**Author Organization:** LERA

KEYWORDS – HIGHLIGHT ALL THAT APPLY

Level 1

Bankers Trust	Project 5	WTC 3 - Marriot Hotel
Below Grade	Project 6	WTC 4 - South Plaza Bldg.
Concourse	Project 7	WTC 5 - North Plaza Bldg.
Electrical Substation	Project 8	WTC 6 - Customs House
Liberty Plaza	WFC 1 - Oppenhiemer Dow	WTC 7
PATH Station	WFC 2 - Tower B	WTC Complex
Project 1	WFC 3 - American Express	WTC Plaza
Project 2	WFC 4 - Tower D	
Project 3	(WTC 1 - North Tower)	Add
Project 4	WTC 2 - South Tower	

Level 2 [redacted]

Accident analysis & risk	(Fire protection)	Misc. Performance Problems	Tenant alterations
Architectural	Fire service	News coverage	Tenant Space
Data request	Landscaping	Police	Add
Emergency management	Management	Security	
Evacuation	Mech./elec.	Structural	

Level 3 [redacted]

1993 explosion	Deck	Hat truss	Shop drawings
A/E fitout	Deflection	Human comfort	Shortening
A-242	Demolition	HVAC	Slab
A-36	Design	Index	Slurry wall
A-497	Detailing	Inspection	Smoke control
Aircraft impact	Doors	Insulation	Smoke test
Air cooled condensers	Drawings	Job number	Spandrel beam
Analysis	Eastern States Steel	Joist	Specifications
Angles	Egress	L-50	Splices
Antenna	(Elevator)	Lighting	Sprinkler
Artifacts	Emergency communications	Loads	Stability
Asbestos	Equipment	Maintenance	Stairways
Base plate	Erection marks	Marking	Standards
Beams	Escalator	Mesh reinforcement	Steel
Bid Invitation	Expansion joint	Mill inspection	Steel composition
Bow tie	Exterior columns	Model	Stiffness
Bracing	Fabrication	Mullion	Structural review
Bridging truss	Family member	Operations	Survivor
Calculations	Field survey	Paint	Tenant list
Carpet	Fire alarms	Partition layout	Testing
Ceilings	(Fireproofing)	Partitions	Tie
Certification	Fire spread	Photos	Tolerances
Chillers	Fire testing	Pipes	Transfer Girders
Cladding	Flag Pole	Plumbing	Triad
Collapse	Flammability	Prestressing	Truss
Columns	Floor	Probability, uncertainty	Vestibule
Communication systems	Floor load	Quality control	Vibration
Composite truss	Floor slab	Ramp	Walls
Computer output	Floor system	Reinforcing (strengthening)	Water supply
Computer program	Floor trusses	Renovation	Weather
Concrete	Foundations	(Repair)	Weight
Connections	Fracture	Research & Development	Weld detail
Construction	Frame	Roof	Weld size
Contract	Frame analysis	Safety	Welding
Core beams	Frequency	Schedule	Wind
Core columns	Fuel	Sculpture	Windows
Cranes	Furniture layout	Security system	Yield strength
Criteria	H Generators	Shear knuckle	
Dampers	Guidelines	Shear test	Add
Debris	Gypsum board	Shear Stud	